UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/042,549	01/09/2002	Christopher A. Michaluk	00029CIP	5470

7590 05/03/2007

Martha Ann Finnegan, Esq.
Cabot Corporation
157 Concord Road
Billerica, MA 01821

EXAMINER	
ZHENG, LOIS L	

ART UNIT	PAPER NUMBER
1742	

MAIL DATE	DELIVERY MODE
05/03/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/042,549	MICHALUK, CHRISTOPHER A.	
	Examiner	Art Unit	
	Lois Zheng	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 February 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-8,10-13,18-35,37-43,45-48 and 53-101* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-8,10-13,18-35,37-43,45-48 and 53-101* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. Claims 2, 18, 23, 28, 37, 53, 58, 63 and 89-95 are amended in view of the claim amendments filed 8 February 2007. Claims 1, 9, 14-17, 36, 44 and 49-52 are canceled in view of the amendments. New claims 96-101 are added in view of the amendments. Therefore, claims 2-8, 10-13, 18-35, 37-43, 45-48 and 53-101 are currently under examination.

Status of Present Office Action

2. Applicant's argument with respect to claims 21 and 28-35 are persuasive. Therefore, corresponding rejections are withdrawn. New rejection grounds are set forth below. This Office Action is **NON-FINAL**.

Status of Previous Objections

3. The objection of claim 95 is withdrawn in view of the claim amendments filed 8 February 2007.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 2-8, 10-12, 18-21, 23-26, 71-79, 89-91, 95-96 and 98-99 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clark et al. "Influence of Transverse Rolling on the Microstructural and Textural Development of Pure Tantalum",

Metallurgical Transactions A, Volume 23A, August 1992, pages 2183-2191(Clark) in view of International Application Publication WO 87/07650(WO '650), and further in view of Friedman et al. US 5,482,672(Friedman).

The teachings of Clark in view of WO'650 are discussed in paragraph 5 of the previous Non-Final Office Action mailed 10 August 2006.

However, Clark in view of WO'650 does not teach the claimed cylindrical shape product with the claimed aspect ratio and diameter.

The teachings of Friedman are discussed in paragraph 6 of the previous Non-Final Office Action or in paragraphs 4-5 of the Final Office Action mailed 17 November 2003.

Regarding the amended cylindrical shape product, one of ordinary skill in the art would have found it obvious to have incorporated the extrusion as taught by Friedman into the process of Clark in view of WO'650 because Friedman teaches extrusion provides a way to make bars, rods and tubes(i.e. cylindrical shaped product) out of tantalum and niobium(see paragraph 5 of the Final Office Action mailed 17 November 2003).

Regarding the claimed starting billet diameter and the final cylindrical shaped product aspect ratio and diameter as recited in claims 2, 18, 23, 89-91 and 96, even though Clark in view of WO'650 and Friedman do not explicitly teach these limitations, one of ordinary skill in the art would have found it obvious to have used extrusion technique of Clark in view of WO'650 and Friedman to any diameter starting billet including the claimed 6 inches to about 14 inches to produce any size cylindrical

product including the claimed aspect ratio of greater than 0.5 with a reduced diameter of 2 ½ inches with expected success depending upon the size of the tantalum product desired.

Regarding claims 21 and 26, even though Clark in view of WO'650 and Friedman do not explicitly teach the claimed water quenching step after extrusion, one of ordinary skill in the art would have found it obvious to have incorporated the claimed water quench step after the extrusion of Clark in view of WO'650 and Friedman in order to speed up the cooling of the tantalum product.

Regarding new claims 98-99, since Clark in view of WO'650 and Friedman teach a cylindrical shaped tantalum product with uniform grain size and are silent with respect to the claimed duplex microstructure, the examiner concludes that Clark in view of WO'650 and Friedman meets the limitations of the instant claims 98-99.

6. Claims 22 and 27-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clark in view of WO '650 and Friedman, and further in view of Wittenauer et al. US 5,121,535(Wittenauer).

The teachings of Clark in view of WO'650 and Friedman are discussed in paragraph 5 above. However, Clark in view of WO'650 and Friedman do not explicitly teach the claimed application of a protective coating prior to extrusion or the claimed machine cleaning step after extrusion.

Wittenauer teaches application of a protective coating to metal workpiece prior to hot working such as extrusion in order to prevent oxidation during processing and the

protective layer can be removed by machining cleaning after hot working(col. 2 lines 7-18)

Regarding claims 22, 27-28, 31-32 and 34-35, it would have been obvious to one of ordinary skill in the art to have incorporated the application of a protective coating prior to extrusion and the removal of protective coating via machine cleaning after extrusion as taught by Wittenauer in the process of Clark in view of WO'650 and Friedman in order to prevent oxidation during processing as taught by Wittenauer.

The remaining claim limitations are rejected for the same reasons as stated in paragraph 5 of the Final Office Action mailed 17 November 2003.

7. Claims 37-43, 45-48, 53-56, 58-61, 80-88, 92-94, 97 and 100-101 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clark in view of Friedman, further in view of Japanese Patent 362104180A(JP '180).

The teachings of Clark in view of Friedman in view of JP'180 are discussed in paragraph 8 of the Non-Final Office Action mailed 25 January 2005. The rejection of the instant claims 37-43, 45-48, 53-55, 58-60, 80-88, 92-94 are maintained for the same reason as stated in paragraph 8 of the Non-Final Office Action mailed 25 January 2005.

Regarding the amended cylindrical shape product, one of ordinary skill in the art would have found it obvious to have incorporated the extrusion as taught by Friedman into the process of Clark in view of Friedman and JP'180 since Friedman teaches extrusion provides a way to make bars, rods and tubes(i.e. cylindrical shaped product) out of tantalum and niobium(see paragraph 5 of the Final Office Action mailed 17 November 2003).

Regarding the claimed starting billet diameter and the final cylindrical shaped product aspect ratio and diameter as recited in claims 37, 53, 58, 92-94 and 97, even though Clark in view of Friedman and JP'180 do not explicitly teach these limitations, one of ordinary skill in the art would have found it obvious to have used extrusion technique of Clark in view of Friedman and JP'180 to any diameter starting billet including the claimed 6 inches to about 14 inches to produce any size cylindrical product including the claimed aspect ratio of greater than 0.5 with a reduced diameter of 2 ½ inches with expected success depending upon the size of the niobium product desired.

Regarding claims 56 and 61, even though Clark in view of Friedman and JP'180 do not explicitly teach the claimed water quenching step after extrusion, one of ordinary skill in the art would have found it obvious to have incorporated the claimed water quench step after the extrusion of Clark in view of Friedman and JP'180 in order to speed up the cooling of the niobium product.

Regarding new claims 100-101, since Clark in view of Friedman and JP'180 teach a cylindrical shaped niobium product with uniform grain size and are silent with respect to the claimed duplex microstructure, the examiner concludes that Clark in view of Friedman and JP'180 meets the limitations of the instant claims 100-101.

8. Claims 57 and 62-70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clark in view of Friedman and JP '180, and further in view of Wittenauer.

The teachings of Clark in view of Friedman and JP '180 are discussed in paragraph 7 above. However, Clark in view of Friedman and JP '180 do not explicitly

teach the claimed application of a protective coating prior to extrusion or the claimed machine cleaning step after extrusion.

Wittenauer teaches application of a protective coating to metal workpiece prior to hot working such as extrusion in order to prevent oxidation during processing and the protective layer can be removed by machining cleaning after hot working(col. 2 lines 7-18)

Regarding claims 57, 62-63, 66-67 and 69-70, it would have been obvious to one of ordinary skill in the art to have incorporated the application of a protective coating prior to extrusion and the removal of protective coating via machine cleaning after extrusion as taught by Wittenauer in the process of Clark in view of Friedman and JP '180 in order to prevent oxidation during processing as taught by Wittenauer.

The remaining claim limitations are rejected for the same reasons as stated in paragraph 8 of the Non-Final Office Action mailed 25 January 2005.

9. Claims 2-8, 10-12, 18-21, 23-26, 71-79, 89-91, 95-96 and 98-99 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turner US 6,331,233 B1(Turner), and further in view of Friedman et al. US 5,482,672(Friedman).

Turner teaches a method for producing high purity tantalum product having a uniform texture and a mean grain size of less than about 100 microns(abstract), Turner further teaches that the starting tantalum preform is a electron-beam melting ingot(col. 1 lines 37-39). The tantalum purity in the process of Turner is at least 99.95%(claims 2 and 5). Turner further teaches that the high purity tantalum ingot hot worked by

repeated deformation such as extrusion, each followed by annealing at 1500-2800F in order to achieve recrytallized microstructure(col. 3 line 50 – col. 4 line 26).

However, Turner does not explicitly teach the claimed cylindrical shape product with the claimed aspect ratio and diameter.

The teachings of Friedman are discussed in paragraph 6 of the previous Non-Final Office Action or in paragraphs 4-5 of the Final Office Action mailed 17 November 2003.

Regarding claims 2-8, 10-12, 18-20, 23-25, 71-79, 89-91 and 95-96, one of ordinary skill in the art would have found it obvious to have used extrusion steps of Turner in making cylindrical shaped product such as bars rods and tubes as taught by Friedman because Friedman teaches that extrusion provides a way to make bars, rods and tubes(i.e. cylindrical shaped product) out of tantalum and niobium(see paragraph 5 of the Final Office Action mailed 17 November 2003).

Regarding claims 37-43, 45-48, 53-55, 58-60, 80-88, 92-94 and 97, even though Turner's teaching is directed to tantalum, one of ordinary skill in the art would have found the claimed extrusion of niobium billet using the process of Turner in view of Friedman obvious and with expected success since tantalum and niobium belong to the same group of metals in the periodic table and exhibit very similar properties.

Regarding the claimed starting billet diameter and the final cylindrical shaped product aspect ratio and diameter as recited in claims 2, 18, 23, 37, 53, 58, 89-94, and 96-97, even though Turner in view of Friedman do not explicitly teach these limitations, one of ordinary skill in the art would have found it obvious to have used extrusion

technique of Turner in view of Friedman to any diameter starting billet including the claimed 6 inches to about 14 inches to produce any size cylindrical product including the claimed aspect ratio of greater than 0.5 with a reduced diameter of 2 ½ inches with expected success depending upon the size of the tantalum product desired.

In addition, the tantalum purity, grain size, extrusion and annealing temperatures as taught by Turner in view of Friedman overlap the claimed tantalum purity, grain size, extrusion and annealing temperatures. Therefore, a prima facie case of obviousness exists. See MPEP 2144.05. The selection of claimed tantalum purity, grain size, extrusion and annealing temperature ranges from the disclosed range of Turner in view of Friedman would have been obvious to one skilled in the art since Turner in view of Friedman teach the same utilities in their disclosed tantalum purity, grain size, extrusion and annealing temperature ranges.

Regarding claims 21, 26, 56 and 61, even though Turner in view Friedman do not explicitly teach the claimed water quenching step after extrusion, one of ordinary skill in the art would have found it obvious to have incorporated the claimed water quench step after the extrusion of Turner in view Friedman in order to speed up the cooling of the tantalum or niobium product.

Regarding new claims 98-101, since Turner in view Friedman teach a cylindrical shaped tantalum or niobium product with uniform grain size and are silent with respect to the claimed duplex microstructure, the examiner concludes that Turner in view Friedman meets the limitations of the instant claims 98-99.

10. Claims 22, 27-35, 57 and 62-70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turner in view of Friedman, and further in view of Wittenauer.

The teachings of Turner in view of Friedman are discussed in paragraph 9 above. However, Turner in view of Friedman do not explicitly teach the claimed application of a protective coating prior to extrusion or the claimed machine cleaning step after extrusion.

Wittenauer teaches application of a protective coating to metal workpiece prior to hot working such as extrusion in order to prevent oxidation during processing and the protective layer can be removed by machining cleaning after hot working(col. 2 lines 7-18)

Regarding claims 22, 27-28, 31-32, 34-35, 57, 62-63, 66-67 and 69-70, it would have been obvious to one of ordinary skill in the art to have incorporated the application of a protective coating prior to extrusion and the removal of protective coating via machine cleaning after extrusion as taught by Wittenauer in the process of Turner in view of Friedman in order to prevent oxidation during processing as taught by Wittenauer.

The remaining claim limitations in the remaining claims are rejected for the same reasons as stated in paragraph 9 above.

Response to Arguments

11. Applicant's arguments filed 8 February 2007 have been fully considered but they are not persuasive.

In the remarks, applicant argues that Clark does not teach forming a cylindrical shape product and WO'650 and Friedman do not remedy this defect.

The examiner respectfully disagrees for the same reasons as stated in the rejection of the amended feature as set forth in paragraphs 5 and 7 above.

Applicant also argues that it would not have been obvious to substitute tantalum with niobium in forming the claimed product using the claimed process.

The examiner does not find applicant's argument persuasive since niobium and tantalum belongs to the same metal group on the periodic table and exhibit very similar properties. One of ordinary skill in the art would have found it obvious to substitute one for the other with expected success. Without factual evidence demonstrating the niobium is significantly different from tantalum in their properties and use as sputtering target, the examiner maintains that the rejection is proper.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lois Zheng whose telephone number is (571) 272-1248. The examiner can normally be reached on 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LLZ

ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700